

ABSTRACT

An apparatus and method for producing particles using supercritical fluid with enhanced mixing. The process includes a vessel having an inner surface defining a chamber. A high-speed shear or turbulent mixer is incorporated inside the vessel in order to create a region of enhanced mixing (mixing zone). A supercritical fluid pump communicates with the first inlet, and supplies supercritical fluid into the mixing zone through the first inlet. A solution pump communicates with the second inlet, and supplies solution into the mixing zone through the second inlet. A mixer assembly includes a motor drive and a rotor. The rotor is in the mixing zone and can mix the solution and the supercritical fluid. Particles are produced when the solution and the supercritical fluid are pumped into the mixing zone while the rotor is mixing. The design of the mixer and the direction of the flow of materials into the chamber creates a plug flow in the mixing zone. The plug flow allows the particles to be removed from the mixing zone as soon as they are precipitated. Because of the high intensity homogeneous mixing and plug flow configuration, the particle uniformity is enhanced and production of composite particles facilitated.